

REMARKS

Claims 1-9 and 12-16 are pending in the application. Claims 10, 11, and 17-38 have been withdrawn from consideration. Claim 12 has been amended to clarify the claimed subject matter. The amendment to claim 12 was not made in response to a rejection of patentability and does not narrow the scope of the claim. No new matter has been added. Reexamination and reconsideration of the claims as requested is respectfully requested.

Claims 36-38 have been withdrawn from consideration by the Examiner. Applicants respectfully traverse this withdrawal.

Claim 1 is rejected under 35 U.S.C. §102 (b) as being anticipated by Uchiyama et al. (US Patent No. 5,800,032) (Uchiyama). Uchiyama teaches, for example as disclosed in FIGs. 2 and 16, a projection system that has a light source (2) is fixed to a fixing member (8) that is mounted on the upper, inside surface of a case (1). Light from the light source passes into a polarized beam splitter (4), which directs the light to a cross dichroic mirror (5). The dichroic mirror separates the incoming light into three different color bands, blue, green and red, and directs each color band to respective light modulation elements (6B, 6G and 6R). The cross dichroic mirror, the polarized beam splitter and the modulation elements are supported on a frame (9) within the case (col. 1, line 65 – col., 2, line 3).

The light modulation elements spatially modulate the light, which is then reflected and combined in the dichroic mirror. The modulated light passes through the polarized beam splitter to the projection optical system (7), which transmits the image to a projection screen. The projector system is placed on a desk or special stand (10) and the height of the case on the stand is adjustable via the use of height adjusting mechanisms (13) (col. 2, lines 4-18).

The invention of claim 1 is directed to an illuminated display device that includes a first light source disposed on a mount having a mount surface. The first light source directs light generally along a first axis. A reflective image display unit is disposed on the mount surface with an optical axis substantially parallel to the first

axis. A reflective polarizing film is disposed to direct light from the first light source to the reflective image light display unit.

To anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628,631, 2 USPQ2d 1051 1053 (Fed. Cir.) 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." Richardson v. Suzuki Motor Co., 868 F. 2d1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Therefore, if a reference does not teach every element of the claim, then the reference does not anticipate the claim (see MPEP § 2131).

Uchiyama fails to teach all the elements of claim 1. According to claim 1, the first light source and the reflective image display unit are both mounted to the mount surface of the mount. Uchiyama fails to teach this arrangement of components. Instead, Uchiyama teaches, in FIGs. 2 and 16, that the light source is mounted to a fixing member that is suspended from the upper surface of the projector casing. The blue spatial light modulator is mounted to the cross-dichroic mirror and the red spatial light modulator is mounted between the cross dichroic mirror and the frame. Neither of the red or blue modulators are mounted to the fixing member nor is the light source mounted to the mounting surface of the frame. Accordingly, Uchiyama fails to teach that the first light source and the image display unit are mounted on the same surface.

It is stated in the Office Action that Uchiyama's desk or stand (10) may be taken as being the mount of claim 1. Applicants respectfully disagree with such a characterization of the reference. The light source is not mounted to the desk's surface, but is instead mounted to the projector's casing. In addition, the spatial modulators are not mounted to the desk's surface, but are mounted to the frame. The frame and the casing form part of the projector that sits on the desk. Furthermore, Uchiyama teaches that the projection system merely sits on the desk or the stand – Uchiyama does not teach that the desk or stand is part of the projection system itself.

Accordingly, the desk cannot reasonably be considered to be part of the projection system.

In view of the above, Uchiyama fails to teach all the elements of claim 1, and claim 1 is patentable over Uchiyama.

Claims 1 and 12 are rejected under 35 U.S.C. §102 (e) as being anticipated by Schehrer et al. (US Pub. No. 2002-0003508-A1) (Schehrer). Schehrer teaches an image generator having a miniature display device. The Office Action points particularly to FIGs 1A, 7, 8, and 10a to 10d.

FIG. 1 is a generic figure that shows generalized elements of the display device. In particular, FIG. 1A shows a box representing an image generator, a box representing optics and a human eye. FIG. 1A does not show a first light source mounted on a mounting surface of a mount, nor a reflective image display unit, nor a reflective polarizing film.

In the embodiment illustrated in FIG. 7, Schehrer teaches a light source (501) that directs light from a mirror (502) to a polarizing beamsplitter 505. The light reflected by the polarizing beamsplitter is directed to a spatial light modulator (SLM) 504. The modulated light reflected from the SLM passes through the polarizing beamsplitter to the viewing lens. In this particular embodiment, the light source is oriented so as to direct light in a direction that is parallel to the direction of light incident on the SLM. No mount having a mounting surface is shown in FIG. 7.

The embodiment illustrated in FIG. 8 shows an illumination generator 510 that directs light along a light pipe 511 to a turning mirror 512. The turning mirror directs the light to a polarizing beamsplitter 505, which reflects the light to the SLM (504). The illumination generator is oriented so that it directs light in a direction that parallel to the direction in which light is incident on the SLM. No mount having a mounting surface is shown in FIG. 8.

The embodiment illustrated in FIGs. 10a-10d shows a display in which a light box (533) is mounted on a frame (534) that has two angled wings that support a turning mirror (532) (para. 68). The plane of the output port of the light box is tilted relative to the optical axis through the display (504) and the viewing lens (531) (para.

67). It is not clear whether or not the light box is mounted to the frame. The display, or SLM, is however, not mounted to the frame.

Applicants respectfully assert that Schehrer fails to teach all of the elements of claim 1. One example of the device of claim 1 is shown in FIG. 12 where, as a result of the light source and display being mounted on the same surface, the light from the light source is directed in the same direction as the direction of light reflected from the display.

Schehrer's display devices, on the other hand are different. Schehrer fails to teach that the light source is mounted on the same mounting surface as the reflective image display unit, and has a first axis parallel to the optical axis of the display unit. Instead, in the embodiments shown in FIGs. 7 and 8, there is no disclosure at all of how the display and the light source are mounted. It is unclear from these figures how the light source could be mounted on the same mounting surface as the display, given that the display and the light source are removed from each other and they do not share a common plane. In fact, the light sources of FIGs. 7 and 8 lie well out of the plane of the display so that the light generated by the light source initially propagates in the same direction as that of the light incident on the display. FIGs. 7 and 8 clearly fail to teach the claimed invention.

With regard to the device shown in FIGs. 10a-d, Schehrer likewise fails to teach that the light source is mounted on the same mounting surface as the reflective image display unit, and has a first axis parallel to the optical axis of the display unit. The light box is mounted below the turning mirror, in a position to the outside of the frame – see FIGs. 10a and 10c. The display, on the other hand is positioned to the other side of the frame - see FIG. 10a. Clearly, there is no common surface on the light source and the display are both mounted, and so Schehrer fails to teach the elements of claim 1.

Since Schehrer fails to teach the elements of claim 1, claim 1 is not anticipated by Schehrer and is, therefore, allowable thereover.

Dependent claim 12, which depends from claim 1 and further defines the invention of claim 1, was also rejected under 35 U.S.C. §102(e) as being anticipated

by Schehrer. While Applicants do not acquiesce with the particular rejection to this dependent claim, it is believed that this rejection is moot in view of the remarks made in connection with independent claim 1. Therefore, dependent claim 12 is also in condition for allowance.

Claims 1, 12 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Handschy et al. (US U.S. Patent No. 5,596,451) (Handschy). Handschy teaches, in FIG. 2B a projection system having an illumination arrangement (34) that directs light into a polarization cube (48). The light passes through the cube to a spatial light modulator (36) located on the other side of the cube from the illumination arrangement. Image light, reflected by the spatial light modulator, is deflected by the cube to a mirror (42). The image light also double-passes a quarter-wave plate so that the image light reflected by the mirror is directed through the cube to the viewer (24).

It is stated in the Office Action that Handschy fails to explicitly illustrate that the illuminated display device includes a mount having a mounting surface. It is further stated in the Office Action that it would have been obvious and/or within the level of one of ordinary skill in the art at the time the invention was made that each of the elements of the illuminated display device taught by Handschy would include a supporting substrate and it would have been obvious to mount the elements on the same supporting substrate in order to maintain better optical alignment when the display device is mounted onto a helmet or a pair of glasses.

Three criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference, or combination of references, must teach or suggest all the claim limitations. MPEP § 2142. Applicant respectfully traverses the rejection since the prior art fails to disclose all the claim limitations.

First, the polarizing beamsplitter does not direct light from the first light source to the reflective image light display unit, as is required by claim 1. Instead, in

Handschy's device, the light from the light source passes directly through the polarizing beamsplitter to the spatial light modulator. The polarizing beamsplitter serves the function of directing light reflected from the spatial light modulator to the curved mirror (42), which then reflects the light to the viewer. If the polarizing beamsplitter were removed from Handschy's device, the light from the light source would still reach the spatial light modulator: the polarizing beamsplitter does not direct the light to the spatial light modulator.

This is an important difference between Handschy's device and that of claim 1. In Handschy's device, the polarizing beamsplitter reflects the image light reflected by the spatial light modulator. This configuration makes high demands on the flatness of the polarizing beamsplitter in order to maintain an undistorted image. On the other hand, in claim 1, the reflective polarizing film directs the illumination light to the reflective image display. In the claimed configuration, the polarizing film is permitted to transmit the image light, rather than reflecting the image light. Since the polarizing film does not reflect the image from the reflective image display, the requirements on the flatness of the polarizing film are considerably relaxed, relative to those of Handschy's configuration.

Second, as admitted in the Office Action, Handschy is silent as to how the light source and spatial modulator are mounted, and does not teach or suggest a mount having a mounting surface. More importantly, Handschy fails to teach or suggest that the light source and the spatial light modulator are mounted on the same mounting surface. Applicants do not admit that it would have been obvious for Handschy's light source and spatial light modulator to be mounted on the same surface, especially since the light source and spatial light modulator are disposed on opposite sides of the polarizing beamsplitter.

In summary, Handschy fails to teach or suggest that the polarizing beamsplitter direct the light from the light source to the spatial light modulator in a configuration where the light source directs light along a first axis that is parallel to the axis spatial light modulator. Handschy also fails to teach or suggest that the light source and the spatial light modulator are mounted on the same surface of the mount.

Accordingly, since Handschy fails to teach or suggest all the elements of the claimed invention, claim 1 is not obvious in view of Handschy and is patentable thereover.

Dependent claims 12 and 13, which depend from claim 1 and further define the invention of claim 1, were also rejected under 35 U.S.C. §103(a) as being obvious in view of Handschy. While Applicants do not acquiesce with the particular rejections to these dependent claims, it is believed that these rejections are moot in view of the remarks made in connection with independent claim 1. Therefore, dependent claims 12 and 13 are also in condition for allowance.

Furthermore, claim 12 is directed to a reflector that is disposed to direct light from the first light source to the reflective polarizing film. Handschy fails to teach or suggest a mirror that directs light from the light source to a reflective polarizing film. Instead, Handschy teaches a mirror that reflects image light, received from the spatial light modulator, through the polarizing beamsplitter to the viewer.

Regarding claim 13, Handschy fails to teach or suggest that at least one of the reflector and the reflective polarizing film, that direct light to the reflective image display, is curved in at least one dimension to form a curved reflector.

Claims 2-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Uchiyama. It is stated in the Office Action that Uchiyama teaches all of the claimed subject matter except for the reflective polarizing film being curved. It is further stated in the Office action that it is well known to provide a curved reflective polarizer in the same field of endeavor or analogous art for the purpose of reducing the bulk and weight of a display system or alternating [sic] provide for light concentration, uniform light transmission and/or aberration correction. It is stated that it would have been obvious to modify Uchiyama's beamsplitter to include a curved reflective polarizer in order to increase light concentration, provide uniform light transmission or alternatively reduce optical aberrations, bulk and weight of the display system.

Claims 2-9 and 13-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Schehrer. It is stated in the Office Action that Schehrer discloses all of the subject matter claimed except for the reflective polarizing film being curved, but

that it was well known to curve a reflective polarizer and that it would have been obvious to modify Schehrer's polarizing beamsplitter to include a curved reflective polarizer to increase light concentration, provide uniform light transmission or reduce optical aberrations, bulk and weight of the system.

Dependent claims 2-9 and 13-16, depend from claim 1 and further define the invention of claim 1. While Applicants do not acquiesce with the particular rejections to these dependent claims, it is believed that these rejections are moot in view of the remarks made above in connection with Uchiyama and Schehrer and independent claim 1. Therefore, dependent claims 2-9 and 13-16 are also in condition for allowance.

Regarding claim 2, it is stated in the Office Action that it is well known to use a curved reflective polarizing film. Applicants respectfully disagree that the use of a curved reflective polarizing film was well known.

Regarding claim 3 and 14, there is no disclosure, in Uchiyama, Schehrer or in the Office Action, that teaches or suggests that the reflective polarizing film is curved with a radius of curvature lying parallel to a plane formed by the first axis and the displacement direction.

Regarding claim 4 and 15, there is no disclosure, either in Uchiyama, Schehrer or in the Office Action that teaches or suggests that the reflective polarizing film is curved with a radius of curvature lying parallel to a plane formed by the first axis and an axis orthogonal to both the first axis and the displacement direction.

Regarding claim 5 and 16, there is nothing in Uchiyama, Schehrer or the Office Action that teaches or suggests that it is known to for the reflective polarizing film to be curved with a first radius of curvature lying parallel to a plane formed by the first axis and the displacement direction and be curved with a second radius of curvature lying parallel to a plane formed by the first axis and an axis orthogonal to both the first axis and the displacement direction.

Regarding claim 6, Uchiyama and Schehrer fail to teach or suggest that a first portion of the reflective polarizing film is displaced from the first light source along the first axis and a second portion of the reflective polarizing film is displaced from the

reflective image display unit along the optical axis. Instead, Uchiyama's and Schehrer's polarizing beamsplitters lie only on the first axis.

Regarding claims 7 - 9, which depend from claim 6, Uchiyama and Schehrer fail to teach or suggest either the first or second portions, or both of the first and second portions, of the polarizing film are curved.

Regarding claim 13, Schehrer fails to teach or suggest that at least one of the reflector or the reflective polarizing film is curved in at least one dimension.

Claims 2-9 and 14-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Handschy in view of Handschy et al. (US Patent No. 5,808,800) (Handschy '800).

It is stated in the Office Action that Handschy teaches all of the claimed subject matter, except for the reflective polarizer being curved, and that Handschy '800 teaches that it is known to provide a curved reflective polarizer in the same field of endeavor for the purpose of reducing the bulk and weight of a display system.

The combination of Handschy with Handschy '800 fails to remedy the deficiencies of Handschy discussed above with respect to claims 1, 12 and 13.

Applicants respectfully assert that it would not be obvious to combine the teaching of Handschy '800 of using a curved reflective polarizer with that of Handschy to produce the claimed device.

If one were to accept, *arguendo*, that Handschy '800 teaches a curved polarizing beamsplitter, the proposed combination of references fails to produce the claimed arrangement. Replacing Handschy's polarizing beamsplitter (48) with a curved polarizing beamsplitter does not change the fact that in Handschy's design, the polarizing beamsplitter does not direct the light from the light source to the spatial light modulator but, instead, directs the light reflected from the spatial light modulator to the mirror. Accordingly, the proposed combination of references fails to teach or suggest all the elements of claims 2-9, and these claims are allowable.

Regarding claims 3-5, neither Handschy nor Handschy '800 teach or suggest that the first axis is displaced relative to the optical axis of the reflective image display, where the first axis and the optical axis are parallel. Instead, the axes of Handschy's

light source and spatial light modulator would appear to overlap, with no relative displacement between the two axes.

Regarding claims 4 and 5, neither Handschy nor Handschy '800 teach or suggest that the reflective polarizing film be curved with a radius of curvature lying parallel to a plane formed by the first axis and an axis orthogonal to both the first axis and the displacement direction. Instead, Handschy '800 only teaches that the polarizing beamsplitter be curved in the same plane as the plane of reflection.

Regarding claims 14-16, it is important to note that these claims all depend from claim 13 which, as was discussed above, includes a reflector disposed to direct light from the first light source to the reflective polarizing film. Neither Handschy nor Handschy '800 teach or suggest the reflector.

Furthermore, each of the claims 14-16 include the feature that the optical axis of the reflective image display unit is laterally displaced from the first axis in a displacement direction. Neither Handschy nor Handschy '800 Teach or suggest that there is a relative displacement between the first axis and the optical axis. Instead, Handschy's device, as shown in FIG. 2B, appears to have the axes overlapping. Therefore, the proposed combination fails to teach all the elements of claims 14 -16 and these claims are also allowable.

In view of the reasons provided above, it is believed that all pending claims are in condition for allowance. Applicants respectfully request favorable reconsideration and early allowance of all pending claims. Applicants also request that the species claims withdrawn from consideration be reinstated and allowed along with the currently pending claims.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Iain A. McIntyre at 952-253-4110.

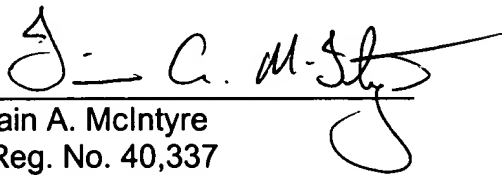
Respectfully submitted,

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Appendix A
Marked Up Version of the Entire Claim Set

Kindly amend claim 12.

1. (unchanged) An illuminated display device, comprising:
a first light source disposed on a mount having a mount surface and directing light generally along a first axis; *not clearly define*
a reflective image display unit disposed on the mount surface with an optical axis substantially parallel to the first axis; and *then one two*
a reflective polarizing film disposed to direct light from the first light source to the reflective image light display unit. *choose one, when.*
2. (unchanged) A device as recited in claim 1, wherein the reflective polarizing film is curved in at least one dimension.
3. (unchanged) A device as recited in claim 2, wherein the optical axis of the reflective image display unit is laterally displaced from the first axis in a displacement direction and the reflective polarizing film is curved with a radius of curvature lying parallel to a plane formed by the first axis and the displacement direction.
4. (unchanged) A device as recited in claim 2, wherein the optical axis of the reflective image display unit is laterally displaced from the first axis in a displacement direction and the reflective polarizing film is curved with a radius of curvature lying parallel to a plane formed by the first axis and an axis orthogonal to both the first axis and the displacement direction.
5. (unchanged) A device as recited in claim 2, wherein the optical axis of the reflective image display unit is laterally displaced from the first axis in a displacement direction and the reflective polarizing film is curved with a first radius of curvature lying parallel to a plane formed by the first axis and the displacement

direction and is curved with a second radius of curvature lying parallel to a plane formed by the first axis and an axis orthogonal to both the first axis and the displacement direction.

6. (unchanged) A device as recited in claim 2, wherein a first portion of the reflective polarizing film is displaced from the first light source along the first axis and a second portion of the reflective polarizing film is displaced from the reflective image display unit along the optical axis.

7. (unchanged) A device as recited in claim 6, wherein the first portion of the reflective polarizing film is curved.

8. (unchanged) A device as recited in claim 6, wherein the second portion of the reflective polarizing film is curved.

9. (unchanged) A device as recited in claim 6, wherein both the first and second portions of the reflective polarizing film are curved.

12. (once amended) A device as recited in claim 1, further comprising a reflector disposed to direct light from the first light source to the reflective polarizing film [layer].

13. (unchanged) A device as recited in claim 12, wherein at least one of the reflector and the reflective polarizing film is curved in at least one dimension to form a curved reflector.

14. (unchanged) A device as recited in claim 13, wherein the optical axis of the reflective image display unit is laterally displaced from the first axis in a displacement direction and the reflective polarizing film is curved with a radius of curvature lying parallel to a plane formed by the first axis and the displacement direction.

15. (unchanged) A device as recited in claim 13, wherein the optical axis of the reflective image display unit is laterally displaced from the first axis in a displacement direction and the reflective polarizing film is curved with a radius of curvature lying parallel to a plane formed by the first axis and an axis orthogonal to both the first axis and the displacement direction.

16. (unchanged) A device as recited in claim 13, wherein the optical axis of the reflective image display unit is laterally displaced from the first axis in a displacement direction and the reflective polarizing film is curved with a radius of curvature lying parallel to a plane formed by the first axis and the displacement direction and is curved with another radius of curvature lying parallel to a plane formed by the first axis and an axis orthogonal to both the first axis and the displacement direction.